

REMARKS

Claims 1, 2, 5/1, and 6/2 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. The applicants respectfully submit that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated May 24, 2002.

Claims 1 - 9 are presently pending in the application. In an election requirement the species of FIG. 7, claims 1, 2 and 4 - 9 were provisionally elected without traverse.

The Examiner states that claim 4 which depends on the non-elected claim 3, claims 5/4 (should be 5/3), 6/4, 7/4 (should be 7/3), or 8/4 are not being examined on their merit. Also, the Examiner states that claims 7 - 9 do not read on the species of Fig. 7; therefore claims 7 - 9 are not being examined on their merit.

The claims being examined at this time are claims 1, 2, 5/1 and 6/2.

The Examiner objects to a typographical error “fist” found on page 14, line 14. The applicants have amended the specification to correct such informality, and informality on page 19, line 6 of the applicants’ specification.

Claims 1, 2, 5/1, and 6/2 are objected to by the Examiner for various reasons recited on pages 2 and 3 of the Office Action. The applicants respectfully request reconsideration of these objections.

As indicated above, claims 1, 2, 5/1, and 6/2 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention, and in order to correct certain informalities therein, including those noted by the Examiner.

Accordingly, the withdrawal of the outstanding objections to the claims is in order, and is therefore respectfully solicited.

As to the outstanding anticipation rejections, first, claims 1 and 2 are rejected under 35 U.S.C. §102(b) as being anticipated by Mettig (U.S. Patent No. 3,976,041). The applicants respectfully request reconsideration of this rejection.

Mettig (‘041) describes a supercharged water cooled internal combustion engine having a supercharger (7), and heat exchangers (4) and (8). Heat exchanger (8) is described as a “water

cooler” and heat exchanger (4) is described as an “air cooled supercharger intercooler.” Only the air cooled supercharger intercooler (4) is provided in a pressurized air passage of the supercharged engine. The water cooler (8) is not shown or described as being disposed so as to carry out heat exchange between pressurized air discharged from an outlet part of the air cooled supercharger intercooler (4) and a second heat exchange medium, and supplying the pressurized air to cylinders of the engine, as defined in the applicants’ claimed invention.

Regarding claim 2, Mettig (‘041) does describe a water cooling type engine and a heat exchange medium of the heat exchanger (8) is cooling water from the water cooling type engine; however, the heat exchanger (8) is not disposed as defined in the claimed invention, as discussed above.

The applicants further respectfully submit that in Mettig (‘041), the AIR TO AIR aftercooler is cooled by fan wind at first, and the radiator is only cooled with the fan wind of the back flow. Accordingly, they use the ordinary AIR TO AIR aftercoolers as charge air cooling, and they do not disclose any of the applicants’ claimed structural arrangements.

Accordingly, the withdrawal of the outstanding anticipation rejection under 35 U.S.C. §102(b) based on Mettig (U.S. Patent No. 3,976,041) is in order, and is therefore respectfully solicited.

Secondly, claims 1 and 2 are rejected under 35 U.S.C. §102(b) as being anticipated by Mettig (U.S. Patent No. 4,075,991). The applicants respectfully request reconsideration of this rejection.

Mettig ('991) is a division of Mettig ('041). Claim amendments and distinctions between the claimed invention and Mettig ('041) discussed above in relation to Mettig ('041) would also apply to the present reference.

As in Mettig ('041), in Mettig ('991), the AIR TO AIR aftercooler is cooled by fan wind at first, and the radiator is only cooled with the fan wind of the back flow. Accordingly, they use the ordinary AIR TO AIR aftercoolers as charge air cooling, and they do not disclose any of the applicants' claimed structural arrangements.

Accordingly, the withdrawal of the outstanding anticipation rejection under 35 U.S.C. §102(b) based on Mettig (U.S. Patent No. 3,976,041) is in order, and is therefore respectfully solicited.

Thirdly, claims 1 and 2 are rejected under 35 U.S.C §102(b) as being clearly anticipated by Melchior (U.S. Patent No. 4,485,624). The applicants respectfully request reconsideration of this rejection.

Melchior describes a supercharged internal combustion engine equipped with an air intercooling system having a supercharger (3,5) and heat exchangers (10) and (14). Heat exchanger (10) cools the compressed air at an outlet from the supercharger compressor (5). Heat exchanger (14) cools water which is circulated through an engine cooling chamber (9) of engine (1). The heat exchanger (14) does not appear to be shown or described as being disposed so as to carry out heat exchange between pressurized air discharged from an outlet port of the heat exchanger (10) and a second heat exchange medium, and supplying the pressurized air to cylinders of the engine as defined in the present claimed invention.

The applicants further respectfully submit that in Melchior, a radiator for cooling engine cooling water and transmission oil is placed in front of the fan wind, and the charge air aftercooler is placed at the back flow. In Melchior, the fan wind passing through the radiator and the fan wind bypassing the radiator are designed to hit the aftercooler, and the bypassing amount is passed or stopped to control the cooling level of the charge air; and therefore the applicants' claimed invention is distinguishable over the teachings of Melchior.

The amendments submitted herewith in relation to the rejections in view of Mettig ('041 and '991) should distinguish the claimed invention from the engine of Melchior.

Accordingly, the withdrawal of the outstanding anticipation rejection under 35 U.S.C. §102(b) based on Melchior (U.S. Patent No. 4,485,624) is in order, and is therefore respectfully solicited.

As to the outstanding obviousness rejection, claims 5/1 and 6/2 are rejected under 35 U.S.C. §103(a) as being unpatentable over either Mettig (U.S. Patent No. 3,976,041), Mettig (U.S. Patent No. 4,075,991), or Melchior (U.S. Patent No. 4,485,624), in view of Jean Ribeton (Patent number GB 2 055 963). The applicants respectfully request reconsideration of this rejection.

Mettig ('041), Mettig ('991), and Melchior ('624) are described above. Ribeton describes a supercharging internal combustion engine having heat exchanger (R1) and Heat Exchanger (R2). Pressurized air from supercharger (10) first passes through heat exchanger (R1) and then through heat exchanger (R2). Heat exchanger (R1) is described as operating at a higher temperature than heat exchanger (R2). Load detecting means (34, 34', and 34'') detect the engine load and in response control the flow of the pressurized air through a bypass duct with use of shutters (30) and (36). The flow rate of medium through heat exchangers (R1) and (R2) is not controlled with the use of the load detectors as defined in the present claimed invention. The relative temperatures of operation of the two heat exchangers is opposite to that of the claimed invention.

The applicants further respectfully submit that Ribeton's apparatus includes a first heat exchanger placed to admit the heat exchanging fluid at a first temperature and a second heat exchanger placed to admit heat exchanging fluid at a second temperature that is lower than the first temperature; and such Ribeton's apparatus has the different structural arrangement from (or, specifically, the inverse arrangement of) the applicants' claimed invention.

Accordingly, the suggested combination of references would still fall far short in fully meeting the applicants' claimed invention; and a person of ordinary skill in the art would not have found the applicants' claimed invention obvious based on the teachings of such references, singly or in combination.

As such, the withdrawal of the outstanding obviousness rejection under 35 U.S.C. §103(a) as being unpatentable over either Mettig (U.S. Patent No. 3,976,041), Mettig (U.S. Patent No. 4,075,991), or Melchior (U.S. Patent No. 4,485,624), in view of Jean Ribeton (Patent number GB 2 055 963) is in order, and is therefore respectfully solicited.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully Submitted,

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PATENT TRADEMARK OFFICE

Enclosures: (1) Version with markings to show changes made

IN THE SPECIFICATION:

Paragraph beginning at page 14, line 10 has been amended as follows:

An engine 3 of the first embodiment is a water cooling type of diesel engine with a supercharger 1 and a hybrid heat exchanger 2, in which supercharged air A2 that is outside air A1 taken in and pressurized in a supercharger 1 is supplied into a cylinder 31 via a [fist]first heat exchanger 2a and a second heat exchanger 2b arranged in series, as shown in a block diagram in FIG. 1.

Paragraph bridging pages 18 and 19 (line 25, page 18 through line 21, page 19) has been amended as follows:

An operation and effects of the second embodiment will be explained. FIG. 6 is a map diagram showing relationship between engine output and supercharged air pressure. Specifically, the vertical axis represent shaft average effective pressure P_{me} , the horizontal axis represents engine speed N , and a curved line L in the graph represents a torque curve. The group of curved lines slanting to the [righ] right represents uniform pressure curves of supercharged air pressure P , and the pressure becomes higher toward the right and diagonally upward. Accordingly, on constant engine speed N_1 shown by the broken line, output power of the engine 3 (specifically, load of the engine 3) is proportional to the supercharged air pressure P . In the second embodiment, the pressure sensor 11 detects the supercharged air pressure P . The controller 7 computes the output power (load) of the

engine 3 from the detected value, and controls the flow of cooling water to the water cooling type of heat exchanger 2b based thereon. Hence it is possible to control the temperature of supercharged air at the outlet port of the water cooling type of heat exchanger 2b to be in a predetermined temperature range, and it is possible to allow the temperature of intake air of the cylinder 31 to converge in a narrower range than in the first embodiment.

IN THE CLAIMS:

Please amend claims 1, 2, 5/1, and 6/2 as follows:

1. (Amended) A supercharged diesel engine [with a supercharger including] having a supercharger for [taking in and] pressurizing [outside air and supplying the pressurized supercharged]ambient air into a cylinder, and a heat exchange[, which is]being provided in a [supercharged] pressurized air passage [from] between an outlet port of said supercharger [to]and an inlet port of said cylinder [and cools the supercharged] for cooling the pressurized air from said supercharger,

wherein said heat exchanger is a hybrid type of heat exchanger comprising

a first heat exchanger for carrying out heat exchange between the [supercharged] pressurized air discharged from the outlet port of said supercharger and a first heat exchange medium, and

a second heat exchanger for carrying out heat exchange between the

[supercharged]pressurized air discharged from an outlet port of said first heat exchanger and a second heat exchange medium having higher temperature than said first heat exchange medium, and supplying the [supercharged] pressurized air, after the heat exchange with said second heat exchange medium, to said cylinder.

2. (Amended) The supercharged diesel engine [with the supercharger] in accordance with Claim 1,

wherein the engine is a water cooling type [of engine with the supercharger using cooling water],

wherein said first heat exchange medium is [outside] ambient air, and

wherein said second heat exchange medium is cooling water from said water cooling type [of] engine.

5. (Amended) The supercharged diesel engine [with the supercharger] in accordance with Claim 1 [or Claim 3], further comprising:

load detecting means for detecting an engine load [of the engine]; and

control means for receiving a detection signal from said load detecting means and controlling flow of said second heat exchange medium.

6. (Amended) The supercharged diesel engine [with the supercharger] in accordance with Claim 2 [or Claim 4], further comprising:

load detecting means for detecting an engine load of said water cooling type [of] engine; and
control means for receiving a detection signal from said load detecting means and controlling flow of cooling water from said water cooling type [of] engine.